II.—Black and white mustard, in No. 60 powder, deprived of fixed oil. 1 part
Benzol solution of India rubber (1 in 40)..... 4 parts

Mix to a smooth mass, and spread the same over one side of a suitable paper by means of a plaster-spreading machine, or passing the paper over the mass contained in a suitable shallow vessel. Expose to warm air for a short time to dry. Preserve the dry paper in well-closed boxes. It may be useful to know that mustard paper, after spreading, should not be long exposed to light and air. By so doing not only does the mustard bleach but the rubber soon perishes. Moreover, mustard paper is hygroscopic, so that in a moist atmosphere it soon loses its virtue. It is, therefore, highly important that mustard paper should be rapidly dried in a warm atmosphere with free ventilation, then at once stored in well-closed packets. Thus prepared they keep well and remain active for many years.

MUSTARDS:
See Condiments.

MYRRH ASTRINGENT:
See Dentifrices.

NAIL, INGROWING.

Copious applications of dried powdered alum are sufficient to cure every case of ingrowing nail in about 5 days. The applications are not painful in the least, and the destruction of the pathologic tissue results in the formation of a hard, resistant, and non-sensitive bed for the nail, a perfect cure for the ingrowing tendency. Apply a fomentation of soap and water for 24 hours beforehand and then pour the alum into the space between the nail and its bed, tamponing with cotton to keep the alum in place, and repeating the application daily. The suppuration rapidly dries up, and pain and discomfort are relieved almost at once.

NAIL POLISHES:
See Cosmetics.

NAPOLEON CORDIAL:
See Wines and Liquors.

NAPHTHOL SOAP:
See Soap.

NEATSFOOT OIL.

Crude neatsfoot oil 5,000 parts
Alcohol, 90 per cent 2,500 parts
Tannin..... 5 parts

Place in a clearing flask, agitate vigorously and allow to stand for 8 days in a warm room with daily repetition of the shaking. Then draw off the spirit of wine on top, rinse again with 1,000 parts of spirit of wine (90 per cent) and place the oil in a temperature of about 53½° F. Allow to stand in this temperature for at least 6 weeks, protected from the light, and then filter.

NEEDLES, ANTI-RUST PAPER FOR:
See Rust Preventives.

NEGATIVES, HOW TO USE SPOILED:
See Photography.

NERVE PASTE:

See also Dental Cements, under Cements.

Arsenious acid..... 4 parts
Morphine sulphate... 2 parts
Clove oil..... 1 part
Creosote, quantity sufficient to make a paste.

After the nerve is destroyed the following paste is to be put in the cavity:

Alum..... 1 part
Thymol..... 1 part
Zinc oxide..... 1 part
Glycerine..... 1 part

NERVINE OINTMENT:
See Ointments.

NESSELRODE PUDDING:
See Ice Creams.

NETS:
See Cordage.

NICKEL-TESTING.

Pure nickel will remain nearly white, while "patent nickel," or nickel-copper will not retain its primitive brilliancy, but soon becomes slightly oxidized and grayish in color. The magnet furnishes a good means of testing. The unadulterated nickel is distinctly sensitive to magnetism, while that much alloyed is destitute of this property.

NICKEL ALLOYS:
See Alloys.

NICKEL, TO REMOVE RUST FROM:
See Cleaning Preparations and Methods.

NICOTINE STAINS, TO REMOVE FROM HANDS:

Hydrogen peroxide 20 per cent ..... 3¼ ounces
Distilled water .... 1¾ ounces
Alcoholic solution, ammonia ..... ½ ounce

Pine needle oil	¼ ounce

Add the pine needle oil to the ammonia solution and shake. Add to water and all to the peroxide. Shake and fill in 1½ ounce or 2 ounce round bottles with attractive label. When storing, keep in dark and cool place to keep from losing strength. Blue or amber bottles can be used.

Obesity Treatment.—

Precipitated Carbonate of Iron	30 grains
Chloride of Soda....	4 drachms
Carbonate of Magnesia	1 drachm
Phosphate of Soda..	2 drachms

Mix these ingredients together well. This mixture can be taken three times a day one teaspoonful in a glass of water.

Oils

Clock Oil.—Put 2,000 parts, by weight, of virgin oil in a decanting vessel, add a solution of 40 parts of ether tannin in 400 parts of water and shake until completely emulsified. Let stand for 8 days, with frequent shaking; next, add 100 parts of talcum and, when this has also been well shaken, 1,600 parts of water. Allow to settle for 24 hours, and then run off the lower water layer, repeating the washing as long as the wash water still shows a coloration with ferric chloride. Pour the contents of the decanting vessel into an evaporating dish; then add 200 parts of thoroughly dried and finely ground cooking salt; let stand for 24 hours and filter through paper. The clock oil is now ready, and should be filled in brown glass bottles, holding 20 to 25 parts (about 1 ounce), which must be corked up well and kept at a cool temperature.

COD-LIVER OIL:

Aromatic Cod-Liver Oil.—

Coumarin.....	0.01	parts
Saccharine.....	0.50	parts
Vanillin.....	0.10	parts
Alcohol, absolute.	5.40	parts
Oil of lemon.....	5.00	parts
Oil of peppermint.	1.00	part
Oil of neroli.....	1.00	part
Cod-liver oil to make	1,000	parts

Deodorized Cod-Liver Oil.—Mix 400 parts of cod-liver oil with 20 parts of ground coffee and 10 parts of bone black, warm the mixture in an open vessel to 140° F., let it stand 5 days, shaking occasionally, and strain through linen. The oil acquires the taste of coffee.

Cod-Liver Oil Emulsions.—

I.—

Calcium hypophosphite.....	80 grains
Sodium hypophosphite.....	120 grains
Sodium chloride..	60 grains
Gum acacia, in powder.....	2 ounces
Elixir of glucoside	20 minims
Essential oil of almonds.....	15 minims
Glycerine.....	2 fluidounces
Cod-liver oil.....	8 fluidounces
Distilled water, a sufficient quantity to produce 16 fluidounces.	

II.—Mix 190 parts of powdered sugar with 5 parts of acacia and 500 parts of tragacanth in a mortar. Mix in a large bottle and shake thoroughly together 500 parts of cod-liver oil and 200 parts of a cold infusion of coffee. Gradually add a part of this mixture to the powder in the mortar and triturate until emulsified. To the remaining liquid mixture add 100 parts of rum, then gradually incorporate with the contents of the mortar by trituration.

Extracting Oil from Cottonseed.—Claim is made for a process of extraction, in an English patent, in which the seeds are placed in a rotable vessel mounted on a hollow shaft divided into compartments by means of a partition. The solvent is introduced at one end of this shaft and passes into the vessel, which is then made to rotate. After the extraction the bulk of the solvent and the extracted oil pass away through an exit pipe, and steam is then introduced through the same opening as the solvent, in order to cook the seeds and expel the residual solvent. The steam and the vapors pass through perforations in a scraper fixed to the shaft and thence through connected pipes into the other compartment of the shaft, the end of which is attached to a condenser.

Silver Nitrate Test for Cottonseed Oil.—Investigations of Charabout and March throw some light on the value of this test in presence of olive oil. The free-fat acids obtained from cottonseed oil by saponification were treated in accordance with the method of Milliau on a water bath with a 3 per cent solution of silver nitrate, and the brown precipitate thus formed subjected to a chemical examination. It was found to consist chiefly of a brown silver salt composed of a fat acid melting at 52° F., and congeal-

ing at 120° to 122° F., and of sulphide of silver. Olive oil, which contains a sulphur compound of an analogous composition, is also capable of forming a more or less distinct precipitate of a dark colored silver sulphide with nitrate of silver. It is important to bear this fact in mind when examining olive oil for cottonseed oil.

Floral Hair Oil.—

White vaseline.....	5,000 parts
Floricin, pure.....	800 parts
Linalool rosé.....	60 parts
Terpineol.....	50 parts
Aubepine (hawthorne), liquid...	12 parts

Floral Hair Pomade.—

White ceresine.....	250 parts
Floricin, pure.....	1,600 parts
Vanillin.....	3 parts
Geranium oil.....	5 parts
Isoeugenol.....	4 parts

Floricin Brilliantine.—

Floricin oil.....	2,100 parts
White ceresine.....	250 parts
Ylang-ylang oil....	2 parts
Kananga oil.....	5 parts
Oil of rose, artificial	1 part
Cheirantia.....	5 parts

Solid Linseed Oil.—Cements for the manufacture of linoleum and other similar substances are composed to a large extent of linseed oil, oxidized or polymerized until it has become solid. The old process of preparing this solid oil is tedious, costly, and invites danger from fire. It consists in running linseed oil over sheets of thin cloth hung from the top of a high building. The thin layer of oil upon the cloth dries, and then a second layer is obtained in the same way. This is continued until a thick skin of solid oil is formed on either side of the cloth. A new method of solidifying linseed oil is by means of alkalies. The drying oils, when heated with basic substances such as the alkalies, polymerize and become solid. Hertkorn makes use of the oxides of the alkaline earths, or their salts with weak acids, such as their soaps. When chalk or lime is added to the oil during the process of oxidation, either during the liquid or the plastic stage, it forms a calcium soap, and causes polymerization to set in in the partially oxidized oil. Similarly, if caustic soda or caustic potash be added, the action is not caused by them in the free state, but by the soaps which they form. Oxidized oil is more readily saponified than raw oil, and the greater the oxidation, the more readily does saponification take place. Lime soaps are not soluble in water, whereas soda and potash soaps are. Consequently a cement made with the latter, if exposed to the weather, will be acted upon by rain and moisture, owing to the soluble soap contained in it, while a cement made with lime will not be acted upon. It is suggested that the action of the bases on linseed oil is simply due to their neutralization of the free acid. The acidity of linseed oil increases as it becomes oxidized. When the basic matter is added part of the free acid is neutralized, and polymerization sets in. The presence of a large amount of free acid must therefore hinder polymerization. From 5 to 10 per cent of chalk or lime is considered to be the amount which gives the best result in practice.

Decolorizing or Bleaching Linseed Oil.—Linseed oil may be bleached by the aid of chemical bodies, the process of oxidizing or bleaching being best performed by means of peroxide of hydrogen. For this purpose, the linseed oil to be bleached is mixed with 5 per cent peroxide of hydrogen in a tin or glass bottle, and the mixture is shaken repeatedly. After a few days have elapsed the linseed oil is entirely bleached and clarified, so that it can be poured off from the peroxide of hydrogen, which has been reduced to oxide of hydrogen, i. e., water, by the process of oxidation. The use of another oxidizing medium, such as chloride of lime and hydrochloric acid or bichromate of calcium and sulphuric acid, etc., cannot be recommended to the layman, as the operation requires more care and is not without danger. If there is no hurry about the preparation of bleached linseed oil, sun bleaching seems to be the most recommendable method. For this only a glass bottle is required, or, better still, a flat glass dish, of any shape, which can be covered with a protruding piece of glass. For the admission of air, lay some sticks of wood over the dish and the glass on top. The thinner the layer of linseed oil, the quicker will be the oxidation process. It is, of course, necessary to place the vessel in such a manner that it is exposed to the rays of the sun for many hours daily.

Linseed Oil for Varnish-Making.—Heat in a copper vessel 50 gallons Baltic oil to 280° F., add 2½ pounds calcined white vitriol, and stir well together. Keep the oil at the above temperature for half an hour, then draw the fire, and in 24 hours decant the clear oil. It should stand for at least 4 weeks.

Refining Linseed Oil.—Put 236 gallons of oil into a copper boiler, pour in 6 pounds of oil of vitriol, and stir them together for 3 hours, then add 6 pounds fuller's earth well mixed with 14 pounds hot lime, and stir for 3 hours. The oil must be put in a copper vessel with an equal quantity of water. Now boil for 8 hours, then extinguish the fire. When cold draw off the water. Let the mixture settle for a few weeks.

MINERAL OIL:

See also Petroleum.

Production of Consistent Mineral Oils.—

	By weight
I.—Mineral oil.....	100 parts
Linseed oil.....	25 parts
Ground nut oil....	25 parts
Lime.....	10 parts
II.—Mineral oil.....	100 parts
Rosin oil.....	100 parts
Rape seed oil.....	50 parts
Linseed oil.....	75 parts
Lime.....	25 parts

Mixing Castor Oil with Mineral Oils.—Castor oil is heated for 6 hours in an autoclave at a temperature of 500° to 575° F., and under a pressure of 4 to 6 atmospheres. When cold the resulting product mixes in all proportions with mineral oils.

BLEACHING OILS:

Linseed Oil or Poppy Oil.—Agitate in a glass balloon 25,000 parts, by weight, of oil with a solution of 50 parts, by weight, potassium permanganate in 1,250 parts, by volume, of water. Let stand for 24 hours at a gentle warmth and add 75 parts, by weight, of powdered sodium sulphite. Agitate strongly and add 100 parts, by weight, of hydrochloric acid and again agitate. Let stand until decolorization takes place, then wash the oil with a sufficiency of water, carrying in suspension chalk, finely powdered, until the liquid no longer has an acid reaction. Finally filter off over anhydrous sodium sulphate.

Boiled Oil.—The following is especially adapted for zinc painting, but will also answer for any paint: Mix 1 part binoxide of manganese, in coarse powder, but not dusty, with 10 parts nut or linseed oil. Keep it gently heated and frequently stirred for about 30 hours, or until the oil begins to turn reddish.

British Oil.—

I.—Oil of turpentine....	40 parts
Barbadoes pitch....	26 parts
Oil of rosemary.....	1 part
Oil of origanum....	1 part
II.—Oil of turpentine....	2 parts
Rape oil.....	20 parts
Spirit of tar.....	2 parts
Alkanet root, quantity sufficient.	

Macerate the alkanet root in the rape oil until the latter is colored deep red; then strain off and add the other ingredients.

Decolorizing and Deodorizing Oils.—I.—One may partially or completely deodorize and decolorize rank fish and other oils by sending a current of hot air or of steam through them, after having heated them from 175° to 200° F. To decolorize palm oil pass through it a current of steam under pressure corresponding to a temperature of 230° F., agitating the oil constantly. The vapor is then passed through leaden tuyeres of about 2 inches diameter, 10 hours being sufficient for deodorizing 4 tons of oil.

II.—Another method that may be applied to almost all kinds of fats and oils with excellent results is the following: Melt say 112 parts, by weight, of palm oil in a boiler. When the mass is entirely liquefied add to it a solution of calcium chloride, made by dissolving 7 parts, by weight, of lime chloride for every 84 parts, by weight, of oil in water, and mix intimately. After cooling, the mass hardens and is cut into small bits and exposed to the air for a few weeks. After this exposure the material is reassembled in a boiler of iron, jacketed on the inside with lead; a quantity of sulphuric acid diluted to 5 per cent, equal in amount to the lime chloride previously used, is added, and heat is applied until the oil melts and separates from the other substances. It is then left to cool off and solidify.

Decomposition of Oils, Fats, etc.—In many of the processes at present in use, whereby oils and fats are decomposed by steam at a high pressure, the time during which the oil or fat has to be exposed to high pressure and temperature has the effect of considerably darkening the resulting product. Hannig's process claims to shorten the time required, by bringing the steam and oil into more intimate contact. The oil to be treated is projected in fine streams into the chamber containing steam at 8 to 10 atmospheres pressure. The streams of oil are projected with sufficient force to cause them to strike against the walls of the chamber, and they are thus broken up into minute globules which mix intimately with the steam. In this way the most satisfactory conditions for the decomposition of the oil are obtained.

Driffield Oils.—

Barbadoes tar	1	ounce
Linseed oil	16	ounces
Oil turpentine	3	ounces
Oil vitriol	½	ounce

Add the oil of vitriol to the other ingredients very gradually, with constant stirring.

Drying Oils.—To dry oils for varnishes, paintings, etc., the most economical means is to boil them with shot, to leave them for some time in contact with shot, or else to boil them with litharge. Another method consists in boiling the oils with equal parts of lead, tin, and sulphate of zinc in the ratio of $\frac{1}{10}$ part (weight) of the united metals to 1 part of oil to be treated. These metals must be granulated, which is easily accomplished by melting them separately and putting them in cold water. They will be found at the bottom of the water in the shape of small balls. It is in this manner, by the way, that shot is produced.

Dust-Laying Oil.—A process has been patented for rendering mineral oils miscible in all proportions of water. The method consists of forming an intimate mixture of the oil with a soap which is soluble in water. The most simple method is as follows: The oil is placed in a tank provided with an agitator. The latter is set in motion and the fatty oil or free fatty acid from which the soap is to be formed is added, and mixed intimately with the mineral oil. When the mixture is seen to be thoroughly homogeneous, the alkali, in solution in water, is added little by little and the stirring continued until a thorough emulsion is obtained, of which the constituents do not separate, even after prolonged standing at ordinary temperatures. The agitation may be produced either by a mechanical apparatus or by forcing air in under pressure. As a rule, the operation can be carried out in the cold, but in certain cases the solution of the fatty body and its saponification requires the application of moderate heat. This may be obtained by using either a steam-jacketed pan, or by having the steam coil within the pan, or live steam may be blown through the mixture, serving at the same time both as a heating and stirring agent. Any fatty matter or fatty acid suitable for soap-making may be used, and the base may be any one capable of forming a soluble soap, most commonly the alkaline hydroxides, caustic soda, and caustic potash, as also ammonia. The raw materials are chosen according to the use to which the finished product is to be applied. A good formula, suitable for preparing an oily liquid for watering dusty roads, is as follows:

	By weight	
Heavy mineral oil	75	parts
Commercial olein	2	parts
Commercial ammonia	1.5	parts
Water	21.5	parts

Floor Oils.—

I.—Neatsfoot oil	1	part
Cottonseed oil	1	part
Petroleum oil	1	part
II.—Beeswax	8	parts
Water	56	parts
Potassium carbonate	4	parts

Dissolve the potash in 12 parts of water; heat together the wax and the remaining water till the wax is liquefied; then mix the two and boil together until a perfect emulsion is effected. Color, if desired, with a solution of annatto.

Ground-Laying Oil for Ceramics.—Boil together until thoroughly incorporated 1 pint of linseed oil, 1 pint of dissolved gum mastic, ½ ounce of red lead, ½ ounce of rosin. In using mix with Venice turpentine.

Oil Suitable for Use with Gold.—Heat and incorporate linseed oil, 1 quart; rape oil, 1 pint; Canadian balsam, 3 pints; rectified spirits of tar, 1 quart.

Wool Oil.—These are usually produced by the distillation in retorts of Yorkshire grease and other greases. The distilled oil is tested for quality, and is brought down to 70 per cent or 50 per cent grades by the addition of a suitable quantity of mineral oil. The lower the quality of the grease used the lower is the grade of the resulting wool oil.

OIL, CASTOR:
See Castor Oil.

OIL FOR FORMING A BEAD ON LIQUORS:

OILS FOR HARNESS:
See Leather.

OILS (EDIBLE), TESTS FOR:
See Foods.

OIL, HOW TO POUR OUT:
See Castor Oil.

OIL, LUBRICATING:
See Lubricants.

OIL OF WINTERGREEN, SYNTHETIC:

Dissolve 8 grams of salicylic acid in 15 c.c. of methyl alcohol. Carefully add 15 grams of concentrated sulphuric acid. Shake test tube carefully until the two separate layers have mixed. Heat gently for twenty minutes. A layer of the oil will appear that may be separated by the use of a separatory funnel. It is used in flavoring candies, etc.

OILSKINS:

See Waterproofing.

OIL REMOVERS:

See Cleaning Preparations and Methods.

OIL, SOLIDIFIED:

See Lubricants.

Ointments

Arnica Salve.—

Solid extract of arnica	2 parts
Rosin ointment	16 parts
Petrolatum	4 parts
Sultanas	16 parts
Fine cut tobacco	1 part

Boil the raisins and the tobacco in 40 ounces of water until exhausted, express the liquid, and evaporate down to 8 ounces. Soften the arnica extract in a little hot water and mix in the liquid. Melt the rosin ointment and petrolatum together, and add the liquid to the melted mass and incorporate thoroughly.

Barbers' Itch.—

Ichthyol	30 grains
Salicylic acid	12 grains
Mercury oleate (10 per cent)	3 drachms
Lanolin	1 ounce

Mix. To be kept constantly applied to the affected parts.

Brown Ointment.—

Rosin	1 ounce
Lead plaster	4 ounces
Soap cerate	8 ounces
Yellow beeswax	1 ounce
Olive oil	7½ fluidounces

Chilblains.—The following are for unbroken chilblains:

I.—Sulphurous acid	3 parts
Glycerine	1 part
Water	1 part
II.—Balsam Peru	1 part
Alcohol	24 parts
Hydrochloric acid	1 part
Tincture benzoin compound	8 parts

Dissolve the balsam in the alcohol, and add the acid and tincture. Apply morning and evening.

Domestic Ointments.—

I.—Vaseline	80 parts
Diachylon ointment	30 parts
Carbolic acid	4 parts
Camphor	5 parts
II.—Butter, fresh (unsalted)	750 parts
Wax, yellow	125 parts
Rosin, white	100 parts
Nutmeg oil	15 parts
Peru balsam	1 part
III.—Lead plaster, simple	6,090 parts
Vaseline, yellow	1,000 parts
Camphor	65 parts
Carbolic acid	50 parts

Mix.

Green Salve.—

White pine turpentine	8 ounces
Lard, fresh	8 ounces
Honey	4 ounces
Beeswax, yellow	4 ounces

Melt, stir well, and add

Verdigris, powdered	4 drachms

Apply locally.

This cannot be surpassed when used for deep wounds, as it prevents the formation of proud flesh and keeps up a healthy discharge.

Salve for all Wounds.—

Lard, fresh	16 ounces
White lead, dry	3 ounces
Red lead, dry	1 ounce
Beeswax, yellow	3 ounces
Black rosin	2 ounces

Mix, melt, and boil for 45 minutes, then add

Common turpentine	4 ounces

Boil for 3 minutes and cool.

Apply locally to cuts, burns, sores, ulcers, etc. It first draws, then heals.

Irritating Plaster.—

Tar, purified	16 ounces
Burgundy pitch	1 ounce
White pine turpentine	1 ounce
Rosin, common	2 ounces

Melt and add

Mandrake root, powdered	1 drachm
Bloodroot, powdered	1 ounce
Poke root, powdered	1 ounce
Indian turnip root, powdered	1 ounce

Apply to the skin in the form of a

plaster (spread on muslin) and renew it daily.

This salve will raise a sore which is to be wiped with a dry cloth to remove matter, etc. The sore must not be wetted. This is a powerful counter-irritant for removing internal pains, and in other cases where an irritating plaster is necessary.

Mercury Salves.—I.—Red Salve.—Red mercury oxide, 1 part; melted lard, 9 parts.

II.—White Salve.—Mercury precipitate, 1 part; melted lard, 9 parts.

Pink salve.

Ammoniated mercury	1 ounce
Mercuric oxide, precipitated	2½ ounces
Red mercuric sulphide (vermilion)	60 grains
Perfume	½ fluidounce
Lard	1½ pounds
Prepared suet	½ pound

Antiseptic Nervine Ointment.—

Iodoform	2 parts
Salol	4 parts
Boric acid	5 parts
Antipyrine	5 parts
Vaseline	80 parts

Photographers' Ointment.—The following protects the hands from photographic chemicals:

Best castile soap, in fine shavings	1 ounce
Water	1 ounce
Wax	1 ounce
Ammonia	45 minims
Lanolin	1 ounce

The soap is dissolved in the water heated for that purpose, the wax mixed in with much stirring, and, when all is in solution, the ammonia is added. When clear, the lanolin is put in, and then, if the mixture is very thick, water is added until the whole has the consistency of honey. Keep in a covered stoneware jar. The hands should be first washed with ordinary soap, and then, while the lather is still on them, a bit of the mixture about the size of a hazel nut is rubbed in until all is absorbed, and the hands are dry. At the close of the work, the film of wax is washed off in warm water and a little lanolin rubbed into the hands.

Pain-Subduing Ointment.—The following is an excellent formula:

Tincture of capsicum	5 parts
Tincture of camphor	1 part
Ammonia water	2 parts
Alcohol	2 parts
Soap liniment	2 parts

Skin Ointment.—I.—Add about 2 per cent of phenol to petrolatum, perfuming it with oil of bergamot and color a dull green. It has been suggested that a mixture of Prussian blue and yellow ocher would answer as the coloring agent.

II.—

Phenol	40 grains
Boric acid	2 drachms
Oil of bergamot	90 minims
Petrolatum	1 pound

Color with chlorophyll.

Alum Ointment.—

1 drachm alum powdered very fine
1½ ounce lard

Mix together thoroughly. A very good ointment for piles.

Carbolic Salve.—

1 fluid drachm carbolic acid
3 ounces lard

Melt the lard at a gentle heat, add the carbolic acid and triturate until the mixture is cold.

Nipple Ointment.—

6 drachms white wax
80 grams oil sweet almonds
40 grams clarified honey
25 grams balsam peru

Zinc Ointment.—

1 ounce oxide of zinc
6 ounces lard

Mix together, and can be used for burns, excoriations, and skin diseases attended by discharges.

ORANGE PHOSPHATE:
See Beverages.

ORGEAT PUNCH:
See Beverages, under Lemonades.

ORTOL DEVELOPER:
See Photography.

OXIDIZING:
See Bronzing, Plating, Painting.

OXIDE, MAGNETIC:
See Rust Preventives.

OXOLIN:
See Rubber.

OZONATINE:
See Air Purifying.

PACKAGE POP:
See Beverages, under Ginger Ale.

PACKAGE WAX:
See Waxes.

PACKINGS:

Packing for Stuffing Boxes.—

Tallow	10 parts
Barrel soap, non-filled	30 parts
Cylinder oil	10 parts
Talcum Venetian, finely powdered	20 parts
Graphite, finely washed	6 parts
Powdered asbestos	6 parts

Melt the tallow and barrel soap together, add the other materials in rotation, mix intimately in a mixing machine, and fill in 4-pound cans.

Packing for Gasoline Pumps.—For packing pumps on gasoline engines use asbestos wick-packing rubbed full of regular laundry soap; it will work without undue friction and will pack tightly. Common rubber packing is not as good, as the gasoline cuts it out.

PADS OF PAPER:

See Paper Pads.

PAIN-SUBDUING OINTMENT:

See Ointments.

PAINTING PROCESSES:

Painting Ornaments or Letters on Cloth and Paper.—Dissolve gum shellac in 95 per cent alcohol at the rate of 1 pound of shellac to 3 pints of alcohol, and mix with it any dry color desired. If it becomes too thick, thin with more alcohol. This works free, does not bleed out, imparts brilliancy to the color, and wears well. The preparation can be used also on paper.

Painting on Marble.—To paint marble in water colors, it must be first thoroughly cleaned and all grease completely removed. The slab is washed well, and then rubbed off with benzine by means of a rag or sponge. In order to be quite sure, add a little ox gall or aguoline to the colors. After marble has been painted with water colors it cannot be polished any more.

Painting on Muslin.—To paint on muslin requires considerable skill. Select a smooth wall or partition, upon which tack the muslin, drawing the fabric taut and firm. Then make a solution of starch and water, adding one-fourth starch to three-fourths water, and apply a glaze of this to the muslin. To guard against the striking in of the paint, and to hold it more securely in place and texture, mix the pigment with rubbing varnish to the consistency of a stiff paste, and then thin with turpentine to a free working condition. A double thick camel's-hair brush, of a width to correspond properly with the size of the surface to be coated, is the best tool with which to coat fine muslin. A fitch-hair tool is probably best suited to the coarser muslin. Many painters, when about to letter on muslin, wet the material with water; but this method is not so reliable as sizing with starch and water. Wetting canvas or duck operates very successfully in holding the paint or color in check, but these materials should not be confounded with muslin, which is of an entirely different texture.

PAINTING ON LEATHER:

See Leather.

PAINTINGS:

Protection for Oil Paintings.—Oil paintings should under no circumstances be varnished over before the colors are surely and unmistakably dry, otherwise the fissuring and early decay of the surface may be anticipated. The contention of some people that oil paintings need the protection of a coat of varnish is based upon the claim that the picture, unvarnished, looks dead and lusterless in parts and glossy in still others, the value and real beauty of the color being thus unequally manifested. It is not to be inferred, however, that a heavy coating of varnish is required. When it is deemed advisable to varnish over an oil painting the varnish should be mastic, with perhaps 3 or 4 drops of refined linseed oil added to insure against cracking. A heavy body of varnish used over paintings must be strictly prohibited, inasmuch as the varnish, as it grows in age, naturally darkens in color, and in so doing carries with it a decided clouding and discoloration of the delicate pigments. A thinly applied coat of mastic varnish affords the required protection from all sorts and conditions of atmospheric impurities, besides fulfilling its mission in other directions.

Oil paintings, aquarelles, etc., may be also coated with a thin layer of Canada balsam, and placed smoothly on a pane of glass likewise coated with Canada balsam, so that both layers of balsam come together. Then the pictures are pressed down from the back, to remove all air bubbles.

To Renovate Old Oil Paintings.—When old oil paintings have become dark and cracked, proceed as follows: Pour alcohol in a dish and put the picture over it, face downward. The fumes of the alcohol dissolve the paint of the picture, the fissures close up again, and

the color assumes a freshness which is surprising. Great caution is absolutely necessary, and one must look at the painting very often, otherwise it may happen that the colors will run together or even run off in drops.

PAINTINGS, TO CLEAN:
See Cleaning Preparations and Methods.

Paints

(See also Acid-Proofing, Ceramics, Enamels, Fireproofing, Glazing, Painting Processes, Pigments, Rust Preventives, Varnishes, and Waterproofing.)

PAINT BASES:

Dry Bases for Paints.—The following colors and minerals, mixed in the proportions given and then ground to fine powder, make excellent dry paints, and may be thinned with turpentine oil, and a small percentage of cheap varnish to consistency required.

Buff.—

Yellow ocher	44	pounds
Whiting	6	pounds
Oxide of zinc	5	pounds
Plaster of Paris	½	pound

Brick Brown.—

Yellow ocher	26	pounds
Calcined copperas	4	pounds
Red hematite	1¼	pounds
Best silica	7	pounds
Whiting	18	pounds

Gray.—

Oxide of zinc	30	pounds
White lead	6	pounds
Whiting	12	pounds
Bone black	¼	pound
Yellow ocher	2	pounds

Crimson.—

Indian red	25	pounds
Crocus martis	7	pounds
Oxide of zinc	6	pounds
Whiting	6	pounds

Vandyke Brown.—

Yellow ocher	25	pounds
Whiting	18	pounds
Umber	4	pounds
Oxide of zinc	7	pounds
Purple oxide of iron	1	pound

Blood Red.—

Crocus martis	30	pounds
Whiting	20	pounds
Hematite	3	pounds
Silica	6	pounds
Venetian red	2	pounds

Drab.—

Yellow ocher	40	pounds
Whiting	10	pounds
Oxide of zinc	8½	pounds
Sulphate of barytes	1	pound

Paint for Blackboards.—

Shellac	1	pound
Alcohol	1	gallon
Lampblack (fine quality)	4	ounces
Powdered emery	4	ounces
Ultramarine blue	4	ounces

Dissolve the shellac in the alcohol. Place the lampblack, emery, and ultramarine blue on a cheese-cloth strainer, pour on part of the shellac solution, stirring constantly and gradually adding the solution until all of the powders have passed through the strainer.

Dark-Green Paint for Blackboards.—Mix 1 part Prussian blue and 1 part chrome green with equal parts of gilders' size and alcohol to a thin cream consistency. Apply with a large, stiff brush and after an hour a second coat is given. After 24 to 48 hours smooth the surface with a felt cloth. This renders it rich and velvety. The shade must be a deep black green and the quantities of the colors have to be modified accordingly if necessary. Old blackboards should be previously thoroughly cleaned with soda.

BRONZING SOLUTIONS FOR PAINTS.

I.—The so-called "banana solution" (the name being derived from its odor) which is used in applying bronzes of various kinds, is usually a mixture of equal parts of amyl acetate, acetone, and benzine, with just enough pyroxyline dissolved therein to give it body. Powdered bronze is put into a bottle containing this mixture and the paint so formed applied with a brush. The thin covering of pyroxyline that is left after the evaporation of the liquid protects the bronze from the air and keeps it from being wiped off by the cleanly housemaid. Tarnished picture frames and tarnished chandeliers to which a gold bronze has been applied from such a solution will look fresh and new for a long time. Copper bronze as well as gold bronze and the various colored bronze powders can be used in the "banana solution" for making very pretty advertising signs for use in the drug store. Lettering and bordering work upon the signs can be done with it. Several very small, stiff painters' brushes are needed for such work and they must

be either kept in the solution when not in use, or, better still, washed in benzine or acetone immediately after use and put away for future service. As the "banana solution" is volatile, it must be kept well corked.

II.—A good bronzing solution for paint tins, applied by dipping, is made by dissolving Syrian asphaltum in spirits of turpentine, etc., and thinning it down with these solvents to the proper bronze color and consistency. A little good boiled oil will increase the adherence.

Paint Brushes.—To soften a hard paint brush, stand the brush overnight in a pot of soft soap and clean in warm water. Afterwards clean in benzine. If the brush is wrapped with a string do not let the string touch the soap.

Paint brushes which have dried up as hard as stone can be cleaned in the following manner: Dissolve 1 part soda in 3 parts water; pour the solution in a cylinder glass, and suspend in it the brushes to be cleaned, so that they are about 2 inches from the bottom of the vessel. Let it remain undisturbed at a temperature of 140° to 158° F., 12 to 24 hours, after which the most indurated brushes will have become soft, so that they can be readily cleaned with soap. It is essential, however, to observe the temperature, as bristle brushes will be injured and spoiled if the heat is greater.

Black.—A Permanent Black of Rich Luster for Metal Boxes. — Dissolve chlorate of potassium and blue vitriol, equal parts, in 36 times as much water, and allow the solution to cool. The parts to be blacked may be either dipped in the solution, or the solution may be flowed on and allowed to remain until the metal becomes black, after which the fixtures should be rinsed in clean water and allowed to dry. Those parts of the surface which show imperfections in the black should be recoated.

Dead White on Silver Work, etc.—Bruise charcoal very finely and mix it with calcined borax in the proportion of 4 parts of charcoal to 1 of borax. Of this make a paste with water; apply this paste on the parts to be deadened; next expose the piece to the fire of well-lit coal until it acquires a cherry-red shade; allow to cool and then place it in water slightly acidulated with sulphuric acid. The bath must not be more than 5° Bé. Leave the piece in the bath about 2 hours, then rinse off several times.

White Coating for Signs, etc.— A white color for signs and articles exposed to the air is prepared as follows for the last coat: Thin so-called Dutch "stand" oil with oil of turpentine to working consistency, and grind in it equal parts of zinc white and white lead, not adding much siccative, as the white lead assists the drying considerably. If the paint is smoothed well with a badger brush, a very durable white color of great gloss is obtained. Linseed oil, or varnish which has thickened like "stand" oil by long open storing, will answer equally well.

To Prevent Crawling of Paints.—Probably the best method to pursue will be to take an ordinary flannel rag and carefully rub it over the work previous to varnishing, striping, or painting. This simple operation will obviate the possibility of crawling.

In some instances, however, crawling may be traced to a defective varnish. The latter, after drying evenly on a well-prepared paint surface will at times crawl, leaving small pitmarks. For this, the simple remedy consists in purchasing varnish from a reputable manufacturer.

FIREPROOF PAINTS:

See also Fireproofing.

Fireproofing paints of effective quality are prepared in different ways. Naturally no oily or greasy substances enter into their composition, the blending agent being simply water.

I.—One of the standing paints consists of 40 pounds of powdered asbestos, 10 pounds of aluminate of soda, 10 pounds of lime, and 30 pounds of silicate of soda, with the addition of any non-rosinous coloring matter desired. The whole is thoroughly mixed with enough water to produce a perfect blend and render an easy application. Two or more coats of this is the rule in applying it to any wood surface, inside or outside of building.

II.—Another formula involves the use of 40 pounds of finely ground glass, a like amount of ground porcelain, and similarly of China clay or the same quantity of powdered asbestos, and 20 pounds of quicklime. These materials are ground very fine and then mixed in 60 pounds of liquid silicate of soda with water, as in the preceding formula. Two or more coats, if necessary, are given.

Each of these paints is applied with a brush in the ordinary way, the drying being accomplished in a few hours, and, if coloring matter is desired, the above proportions are varied accordingly.

III.—A surface coated with 3 coats of water glass, these 3 coats being subse-

quently coated with water glass containing enough whiting or ground chalk to make it a trifle thicker than ordinary paint, is practically non-inflammable, only yielding to fierce consuming flames after a somewhat protracted exposure.

IV.—Zinc white, 70 pounds; air-slaked lime, 39 pounds; white lead, 50 pounds; sulphate of zinc, 10 pounds; silicate of soda, 7 gallons. The zinc white and lime are mixed together, then ground in elastic oil, after which the silicate of soda is added, this addition being followed by the white lead and sulphate of zinc. This white paint can be colored to meet any desired shade and it may be classed as a good working paint and probably fireproof to the same extent that most of the pretentiously sounded pigments on the markets are.

Fireproof and Waterproof Paints.—The following recipes are claimed to resist both fire and water: A preparation for protecting wood against the action of fire and of moisture, and also for producing on the surface of wood and metal a coat, insulating with reference to electricity and preservative from corrosion, has been introduced in France by Louis Bethisy and Myrthil Rose. The bases or fundamental raw materials quite distinct from those hitherto employed for the same purpose, are 100 parts, by weight, of nitro-cellulose and 30 parts, by weight, of chloride of lime, dissolved in 50 per cent alcohol.

Preparation of the Bases.—The cellulose (of wood, paper, cotton, linen, ramie, or hemp) is put in contact with two-thirds part of sulphuric acid of 66° Bé. and one-third part of nitric acid of 42° Bé. for some 20 or 30 minutes, washed with plenty of water, and kept for 24 hours in a tank of water supplied with an energetic current.

The nitro-cellulose thus obtained is bleached for this purpose; a double hypochlorite of aluminum and magnesium is employed. This is obtained by grinding together 100 parts of chloride of lime, 60 parts of aluminum sulphate, 23 parts of magnesium sulphate, with 200 parts of water.

When the nitro-cellulose is bleached and rewashed, it is reduced to powder and dried as thoroughly as possible. It is then placed in a vat hermetically closed and put in contact with the indicated proportion of calcium chloride dissolved in alcohol. This solution of calcium chloride should be prepared at least 24 hours in advance and filtered.

Composition of the Coating.—This has the following constituents: Bases (nitro-cellulose and solution of calcium chloride), 1 part; amyl acetate (solvent of the bases), 5 parts, by weight; sulphuric ether of 65°, 1.650 parts, by weight; alcohol, 0.850 parts, by weight; one of these powders, alum, talc, asbestos, or mica, 0.100 parts. Other solvents may be employed instead of amyl acetate; for example, acetone, acetic acid, ether alcohol, or methylic alcohol. The ether alcohol furnishes a product drying very quickly. If a very pliant coating is desired, the amyl acetate is employed preferably, with addition of vaseline oil, 0.20 parts, and lavender oil, 0.010 parts.

Method of Operating.—The sulphuric acid is mixed with the alcohol, and left for an hour in contact, shaking from time to time. Afterwards the amyl acetate is added, and left in contact for another hour under similar agitation. In case of the employment of vaseline oil and lavender oil, these two are mingled in ether alcohol. The base is introduced and left in contact for 24 hours, with frequent agitation. The fluidity of the product is augmented by increasing the quantity of the solvent.

Properties.—Wood covered with this coating is fireproof, non-hygrometric, and refractory to the electric current. It also resists the action of acids and alkalies. Metals covered with it are sheltered from oxidation, and effectually insulated on their surface from the electric current. The coating is liquid in form, and applied like collodions, either by the brush or by immersion or other suitable method.

Paint Deadening.—In order to obtain an even dullness of large walls, proceed as follows: After all the dirt has been carefully swept off, oil with 2 parts linseed oil and 1 part turpentine and rub down the smooth places in the wet oil with pumice stone. When the oil coating is dry, mix the ground paint, consisting of whiting, 2 parts; and white lead, 1 part; both finely ground and diluted as above. Do not apply the grounding too thin, because the chalk in itself possesses little covering power. It is not the mission of the chalk, however, to adulterate the material, but to afford a hard foundation for the subsequent coats. For the third coating take white lead, 1 part; and zinc white, 1 part; thin as above and blend with a soft hair pencil. For the final application use only zinc white, ground stiff in oil with any desired mixing color and thinned with turpentine and rain water. Mix the

water and the turpentine with the color at the same time, and this coat may be dabbed instead of blended. By the addition of water the paint becomes dull more slowly and is a little more difficult to lay on; but it does not show a trace of gloss after a few days and never turns yellow, even in places less exposed to the air, and besides excels by great permanency.

Another way is to add white wax instead of water to the last coating. This wax paint also gives a handsome dullness but is more difficult of treatment. A nice matt coating is also obtained by addition of Venetian soap, dissolved in water instead of the wax. This is very desirable for church decorations where exceptionally large surfaces are to be deadened.

PAINT DRYERS:

I.—Ordinary barytes...	25	pounds
Whiting.....	4	pounds
Litharge.....	2	pounds
Sulphate of zinc....	2	pounds
Sugar of lead.....	2	pounds
Boiled linseed oil....	5	pounds
Plaster of Paris.....	½	pound
II.—Whiting.....	16	pounds
Barytes.....	16	pounds
White lead.....	3	pounds
Boiled linseed oil...	¾	gallon

PAINTS FOR GOLD AND GILDING:

Gold Paints.—The formulas of the various gold paints on the market are carefully guarded trade secrets. Essentially they consist of a bronze powder mixed with a varnish. The best bronze powder for the purpose is what is known in the trade as "French flake," a deep gold bronze. This bronze, as seen under the microscope, consists of tiny flakes or spangles of the bronze metal. As each minute flake forms a facet for the reflection of color, the paint made with it is much more brilliant than that prepared from finely powdered bronze.

For making gold paint like the so-called "washable gold enamel" that is sold by the manufacturers at the present time, it is necessary to mix a celluloid varnish with the French flake bronze powder. This varnish is made by dissolving transparent celluloid in amyl acetate in the proportion of about 5 per cent of celluloid.

Transparent celluloid, finely shredded..... 1 ounce
Acetone, sufficient quantity.
Amyl acetate to make 20 ounces.

Digest the celluloid in the acetone until dissolved and add the amyl acetate. From 1 to 4 ounces of flake bronze is to be mixed with this quantity of varnish. For silver paint or "aluminum enamel," flake aluminum bronze powder should be used in place of the gold. The celluloid varnish incloses the bronze particles in an impervious coating, air-tight and water-tight. As it contains nothing that will act upon the bronze, the latter retains its luster for a long period, until the varnished surface becomes worn or abraded and the bronze thus exposed to atmospheric action.

All of the "gold" or, more properly, gilt furniture that is sold so cheaply by the furniture and department stores is gilded with a paint of this kind, and for that reason such furniture can be offered at a moderate price. The finish is surprisingly durable, and in color and luster is a very close imitation of real gold-leaf work. This paint is also used on picture frames of cheap and medium grades, taking the place of gold leaf or the lacquered silver leaf formerly used on articles of the better grades; it is also substituted for "Dutch metal," or imitation gold leaf, on the cheapest class of work.

A cheaper gold paint is made by using an inexpensive varnish composed of gutta percha, gum dammar, or some other varnish gum, dissolved in benzole, or in a mixture of benzole and benzine. The paints made with a celluloid-amyl-acetate varnish give off a strong banana-like odor when applied, and may be readily recognized by this characteristic.

The impalpably powdered bronzes are called "lining" bronzes. They are chiefly used for striping or lining by carriage painters; in bronzing gas fixtures and metal work; in fresco and other interior decoration, and in printing; the use of a very fine powder in inks or paints admits of the drawing or printing of very delicate lines.

Lining bronze is also used on picture frames or other plastic ornamental work. Mixed with a thin weak glue sizing it is applied over "burnishing clay," and when dry is polished with agate burnishers. The object thus treated, after receiving a finishing coat of a thin transparent varnish, imitates very closely in appearance a piece of finely cast antique bronze. To add still more to this effect the burnishing clay is colored the greenish black that is seen in the deep parts of real antique bronzes, and the bronze powder, mixed with size, is applied only to the most prominent parts or "high lights" of the ornament.

Since the discovery of the celluloid-amyl-acetate varnish, or bronze liquid, and its preservative properties on bronze powders, manufacturers have discontinued the use of liquids containing oils, turpentine, or gums, since their constituents corrode the bronze metal, causing the paint finally to turn black.

Gilding in Size.—The old painters and gilders used to prepare the gold size themselves, but nowadays it is usually bought ready made, barring the white of egg additional. The best and most reliable, and especially suited for fine work, is undoubtedly the red French gold size. It is cleaned, as far as possible, of all impurities, and powdered. For 246 grains take 1 white of egg; put it into a glass, taking care to exclude the yolk entirely—otherwise the burnish will show black spots. Beat the white of egg to a froth with a long, well-cleaned bristle brush; add the froth to the size and grind finely together, which is soon done. When grinding, a little water and red size, if necessary, may be added (use only water for thinning). After being ground, the size is forced through a very fine hair sieve into a perfectly clean vessel, and covered up well, for immediate or subsequent use.

The raw stuff of the red size is bolus, which is dug in France and Armenia in excellent quality. Besides the red size there are yellow, white (pipe clay), blue, and gray (alumina), which are used for certain purposes, to enumerate which here would lead too far.

For burnish gold, always take yellow size for ground work. Dip a finely ground bristle brush in the gold size prepared for use; fill a well-cleaned glass (holding 1 pint) half full of water, and add the size contained in the brush, also about 4 to 5 spoonfuls of pure alcohol. It is advisable not to take too much size; the liquid, when applied, must hardly have a yellow tint. When this is dry soon after, commence applying the size, for which a hair pencil is used. The essentials are to paint evenly and not too thickly, so that the tone remains uniform. Apply three coats of size.

When the size is laid on correctly and has become dry, brush the whole with a special brush, or rub with a flannel rag, so as to obtain the highest possible luster. The size must not stand too long; otherwise no gloss can be developed. After brushing, coat the work with weak glue water and wrap it up in tissue paper if the gilding is not to be done at once.

The strictest cleanliness is essential, as the red gold size is very sensitive. The parts where the size has been applied must not be touched with the hand, else grease spots will ensue, which will make a flawless gloss in gilding impossible. The least relaxation of the necessary attention may spoil the whole job, so that everything has to be ground off again.

The necessary tools for the application of gold leaf are: Hair pencils of various sizes, tip, cushion, and gilding knife, as with oil-gilding. Take pure alcohol or grain brandy, and dilute with two-thirds water. When ready to apply the gold leaf, dip a hair pencil of suitable size into the fluid, but do not have it full enough that the alcohol will run on the size ground. Moisten a portion of the ground surface as large as the gold leaf, which is laid on immediately after. Proceed in the same manner, first moistening, then applying the ready-cut gold leaf. The latter must not be pressed on, but merely laid down lightly, one leaf a little over the edge of the previous one, without using up too much gold. Technical practice in gold-leaf gilding is presupposed; through this alone can any skill be acquired, reading being of no avail.

The leaf of gold being applied, all dust must be swept off by means of a light, fine hair pencil (but never against the overlapping edges), and the burnishing is commenced. For this purpose there are special agate tools of the shape of a horn. Flint stone, blood stone, and wolf's teeth are sometimes, but gradually more seldom, employed. Burnish till a full, fine luster appears; but very carefully avoid dents and lines, not to speak of scratches, which would be very hard to mend.

Gold Enamel Paints.—

I.—Pure turps	6	pints
Copal varnish	1	pint
Good gold bronze	6½	pounds
Calcis hydrate (dry-slaked lime)	½	ounce

Mix the varnish and turps at a gentle heat, then slake well with the lime, and settle for a few days, then pour off the clean portion and mix with the powder.

II.—White hard varnish	1	gallon
Methylated spirit	¾	gallon
Gold bronze	12	pounds
Finely powdered mica	3	ounces

Mix the varnish and the spirit, reduce the mica to an impalpable powder, mix with the gold, then add to the liquid. Many bronze powders contain a goodly

proportion of mica, as it imparts brilliancy. Powdered mother-of-pearl is used also.

GRAINING WITH PAINT:

See also Wood.

Oak Graining.—Prepare a paint of two-thirds of white lead and one-third of golden ocher with the requisite amount of boiled linseed oil and a little drier, and cover the floor twice with this mixture, which possesses great covering power. When the last coating is dry, paint the floor with a thinly liquid paint consisting of varnish and sienna, applying the same in the longitudinal direction of the boards. Treat a strip about 20 inches wide at a time, and draw at once a broad paint brush or, in the absence of such, an ordinary brush or goose feather along the planks through the wet paint, whereupon the floor will acquire a nicely grained appearance. The paint requires several days to dry. A subsequent coating of varnish will cause the graining to stand out still more prominently.

Birch.—Imitations of birch are usefully employed for furniture. The ground should be a light, clean buff, made from white lead, stained with either yellow ocher or raw sienna in oil. In graining, brush over the surface with a thin wash of warm brown, making the panel of 2 or 3 broad color shades. Then take a large mottler and mottle the darker parts into the light, working slantwise, as for maple, but leaving a broad and stiff mark. While this is still wet soften the panel and then slightly mottle across the previous work to break it up. When thoroughly dry, carefully wet the work over with clean water and clean mottler, and put in darker overgrain with a thin oak overgrainer or overgrainer in tubes.

Maple.—Sixty pounds white lead; 1 ounce deep vermilion; 1 ounce lemon chrome.

Ash.—Sixty pounds white lead; 1 ounce deep vermilion; 1 ounce lemon chrome.

Medium Oak.—Sixty pounds white lead; 2 pounds French ocher; 1 ounce burnt umber.

Light Oak.—Sixty pounds white lead; 1 ounce lemon chrome; ½ pound French ocher.

Dark Oak.—Sixty pounds white lead; 10 pounds burnt umber; 1½ pounds medium Venetian red.

Satin Wood.—Sixty pounds white lead; 1 ounce deep vermilion; 1½ pounds lemon chrome.

Pollard Oak.—Seventy-five pounds white lead; 20 pounds French ocher; 3 pounds burnt umber; 2½ pounds medium Venetian red.

Pitch Pine.—Sixty pounds white lead; ¼ pound French ocher; ½ pound medium Venetian red.

Knotted Oak.—Sixty pounds white lead; 9 pounds French ocher; 3½ pounds burnt umber.

Italian Walnut.—Sixty pounds white lead; 6 pounds French ocher; 1½ pounds burnt umber; 1¼ pounds medium Venetian red.

Rosewood.—Nine and one-half pounds burnt umber; 40 pounds medium Venetian red; 10 pounds orange chrome.

Dark Mahogany.—Nine and one-half pounds burnt umber; 40 pounds medium Venetian red; 10 pounds orange chrome.

Light Mahogany.—Sixty pounds white lead; 3 pounds burnt umber; 10 pounds medium Venetian red.

American Walnut.—Thirty pounds white lead; 9 pounds French ocher; 4 pounds burnt umber; 1 pound medium Venetian red.

LUMINOUS PAINTS.

The illuminating power of the phosphorescent masses obtained by heating strontium thiosulphate or barium thiosulphate is considerably increased by the addition, before heating, of small quantities of the nitrates of uranium, bismuth, or thorium. Added to calcium thiosulphate, these nitrates do not heighten the luminosity or phosphorescence. The product from strontium thiosulphate is more luminous than that of the barium compound. Among the best luminous paints are the following:

I.—Lennord's.—One hundred parts, by weight, of strontium carbonate; 100 parts, by weight, of sulphur; 0.5 parts, by weight, of potassium chloride; 0.5 parts, by weight, of sodium chloride; 0.4 parts, by weight, of manganese chloride. The materials are heated for three-quarters of an hour to one hour, to about 2,372° F. The product gives a violet light.

II.—Mourel's.—One hundred parts, by weight, of strontium carbonate; 30 parts, by weight, of sulphur; 2 parts, by weight, of sodium carbonate; 0.5 parts, by weight, of sodium chloride; 0.2 parts, by weight, of manganese sulphate. The method of treatment is the same as in the first, the phosphorescence deep yellow.

III.—Vanino's.—Sixty parts, by weight, of strontium thiosulphate; 12 parts, by weight, of a 0.5 per cent acidified alcoholic solution of bismuth nitrate; 6 parts, by weight, of a 0.5 per cent alcoholic solution of uranium nitrate. The materials are mixed, dried, brought gradually to a temperature of 2,372° F., and heated for about an hour. The phosphorescence is emerald green.

IV.—Balmain's.—Twenty parts, by weight, of calcium oxide (burnt lime), free from iron; 6 parts, by weight, of sulphur; 2 parts, by weight, of starch; 1 part, by weight, of a 0.5 per cent solution of bismuth nitrate; 0.15 parts, by weight, of potassium chloride; 0.15 parts, by weight, of sodium chloride. The materials are mixed, dried, and heated to 1,300° C. (2,372° F.). The product gives a violet light.

To make these phosphorescent substances effective, they are exposed for a time to direct sunlight; or a mercury lamp may be used. Powerful incandescent gas light also does well, but requires more time.

PAINTS FOR METAL SURFACES:

Blackening Ornaments of Iron.—I.—To give iron ornaments a black-brown to black color, proceed in the following manner The articles are treated with corrosives, cleaned of all adhering grease, and placed in a 10 per cent solution of potassium bichromate, dried in the air, and finally held over an open, well-glowing, non-sooting fire for 2 minutes. The first coloring is usually black brown, but if this process is repeated several times, a pure black shade is obtained. Special attention has to be paid to removing all grease, otherwise the greasy spots will not be touched by the liquid, and the coloring produced will become irregular. Benzine is employed for that purpose and the articles must not be touched with the fingers afterwards.

II.—This process protects the iron from rust for a long time. The treatment consists in coating the objects very uniformly with a thin layer of linseed-oil varnish, and burning it off over a charcoal fire. During the deflagration the draught must be stopped. The varnish will first go up in smoke with a strong formation of soot, and finally burn up entirely. The process is repeated, i. e., after one coating is burned off a new one is applied, until the parts exhibit a uniformly handsome, deep-black color. Next, wipe off the covering with a dry rag, and heat again, but only moderately. Finally, the articles are taken from the fire and rubbed with a rag well saturated with linseed-oil varnish. The black turns completely dull, and forms a real durable covering for the objects.

Black for Polished Iron Pieces.—Apply successive layers of a very concentrated solution of nitrate of manganese dissolved in alcohol over a gentle fire and the water bath. The surfaces to be blackened should be previously heated. By repeating the layers all the tints between brownish black and bluish black may be obtained.

Glossy Black for Bicycles, etc.—

Amber	8 ounces
Linseed oil	4 ounces
Asphaltum	1½ ounces
Rosin	1½ ounces
Oil turpentine	8 ounces

Heat the linseed oil to boiling point, add the amber, asphaltum, and rosin, and when all melted remove from the fire and gradually add the turpentine.

Japan Black.—The following is a good japan black for metal surfaces: Take 12 ounces of amber and 2 ounces of asphaltum. Fuse by heat, and add ½ pint boiled oil and 2 ounces of rosin. When cooling add 16 ounces of oil of turpentine.

Brass and Bronze Protective Paint.—As a protective covering, especially for brass and bronze objects, a colorless celluloid solution is recommended, such as is found in trade under the name of "Zapon" (q. v.).

Paint for Copper.—Dissolve 1 ounce of alum in 1 quart of warm soft water. When cold add flour to make it about the consistency of cream, then add ½ thimble of rosin and ½ ounce of sugar of lead.

Priming Iron.—The following, if carefully carried out, gives the best satisfaction: The first step consists in thoroughly cleaning the surface of the iron, removing all adhesions in the way of dirt, rust, etc., before the question of priming is considered. As paint in this instance is applied more with a view of protecting the iron from atmospheric influences, rather than for a decorative effect, careful attention should be devoted for securing a base or surface which is calculated to produce a thorough and permanent application. A great deal depends upon the nature of the metal to be painted. Common cast iron, for instance, possessing a rough exterior,

with ordinary precautions can be more readily painted with the prospect of a permanent adhesion of the paint, than a planed steel or wrought-iron surface. With the latter it has been demonstrated that a hard and elastic paint is needed, while with regard to cast iron, other paints containing iron oxides are more suitable. For good drying and covering properties, as well as elasticity, a good boiled oil to which has been added an adequate proportion of red lead will be found to form an excellent paint for smooth metal surfaces. The primary object is to protect the surface of the iron from moisture for the purpose of avoiding rust. The priming must therefore be carried out so that it will stick, after which subsequent coats may be added if desired.

It is advisable that articles made of iron should first be coated with linseed-oil varnish. It dries slowly, hardens, and enables the operator afterwards to exercise an effective control over the condition of his material. Iron must be absolutely dry and free from rust when it is to be painted. It is best to apply next a coating of hot linseed oil; when dry this should be followed by a priming of pure red lead in good linseed oil, and the iron should then be painted as desired, using ground oil paints and leaving an interval of a week between each coating. Cementing should be done after the red lead priming, but the last coat must not be given until the whole is thoroughly dry. Bright oil paints and an upper coating with plenty of oil resist the effects of heat better than thin coatings; moreover, rust can be detected in its early stages with the former. Coatings of tar and asphalt (asphalt dissolved in turpentine) are practicable for underground pipes, but are not adapted for pipes exposed to the air, as they are quickly spoiled. Asphalt varnish, used for coating coal scuttles, fire screens, etc., consists of asphalt dissolved in linseed-oil varnish. Iron stoves and stovepipes are best coated with graphite.

Galvanized Iron.—For galvanized iron there has been recommended a wash consisting simply of dilute hydrochloric acid, which produces chloride of zinc, that in combination with the oxygen of the air is said to produce a film upon which oil color takes as good a hold as it would upon ordinary sheet iron.

Another method which has been tested and found effective is to make a solution as follows: One ounce of chloride of copper; 1 ounce nitrate of copper; 1 ounce sal ammoniac, dissolved in 2 quarts of soft water, to which is added 1 ounce of crude or commercial hydrochloric acid. This solution should be made in an earthenware dish or pot, or in glass or stoneware, as tin will precipitate the copper salts and make the solution imperfect. To large surfaces this solution is applied with a broad brush, when the surface assumes a deep black color, which in drying out in from 12 to 24 hours becomes a gray white, upon which the properly prepared primer will take a permanent grip. On the film so produced a much thinner paint will cover very much better than a stouter paint would on the untreated galvanized or ordinary iron surface. A single trial will convince the craftsman that this treatment is a method that will give lasting results, provided he tries the same priming paint on the treated and untreated surface.

To Paint Wrought Iron with Graphite.—In order to make wrought iron look like new mix fine graphite with equal parts of varnish and turpentine oil, adding a little siccative. Paint the iron parts with this twice, allowing to dry each time. Especially the second coating must be perfectly dry before further treatment. The latter consists in preparing graphite with spirit and applying it very thinly over the first coat. After the drying or evaporation of the spirit the graphite last applied is brushed vigorously, whereby a handsome, durable gloss is produced.

Paint for Iron Bodies Exposed to Heat.—Dilute 1 part soda water glass with 2 parts water and mix intimately with the following pigments:

White.—White lead or sulphate of barium.

Yellow.—Chromate of barium, ocher, or uranium yellow.

Green.—Chromic oxide or ultramarine green.

Blue.—Ultramarine.

Brown.—Oxide of cadmium, oxide of manganese or terra di sienna.

Red.—English red or chrome red.

Bronze powder in a suitable quantity may be added to the mixture, but not more paint should be prepared than can be used up in a few hours. The bronze powder may also be strewn on the fresh paint, or applied with a dry brush, to enhance the gloss. This paint is not affected by heat, and is inodorous.

Protective Coating for Bright Iron Articles.—Zinc white, 30 parts; lamp-

black, 2 parts; tallow, 7 parts; vaseline, 1 part; olive oil, 3 parts; varnish, 1 part. Boil together ¼ hour and add ½ part of benzine and ¼ part of turpentine, stirring the mass carefully and boiling for some time. The finished paste-like substance can be readily removed with a rag without the use of solvents.

Rust Paints.—I.—A new rust paint is produced by the following process: Mix 100 parts dry iron sulphate and 87 parts sodium chlorate and heat to 1,500° to 1,800° F. The chlorine set free seems to have a very favorable action on the color of the simultaneously forming iron oxide. In order to avoid, however, too far-reaching an effect of the chlorine gas, about 18 pounds of a substance which absorbs the same mechanically, such as kaolin, ground pumice stone, ocher, etc., are added to the mixture.

II.—A material known under the names of lardite, steatite, agalmatolite, pagodite, is excellently adapted as a substitute for the ordinary metallic protective agent of the pigments and has the property of protecting iron from rust in an effective manner. In China, lardite is used for protecting edifices of sandstone, which crumbles under the action of the atmosphere. Likewise a thin layer of powdered steatite, applied in the form of paint, has been found valuable there as a protector against the decay of obelisks, statues, etc. Lardite, besides, possesses the quality of being exceedingly fine-grained, which renders this material valuable for use in ship painting. Ground steatite is one of the finest materials which can be produced, and no other so quickly and firmly adheres to the fibers of iron and steel. Furthermore, steatite is lighter than metallic covering agents, and covers, mixed in paint, a larger surface than zinc white, red lead, or iron oxide. Steatite as it occurs in Switzerland is used there and in the Tyrol for stoves, since it is fireproof.

Steel.—An excellent coating for steel, imitating the blue color of natural steel, is composed of white shellac, 5 parts; borax, 1 part; alcohol, 5 parts; water, 4 parts; and a sufficient quantity of methylene blue. The borax is dissolved in water, the shellac in alcohol. The aqueous solution of the borax is heated to a boil and the alcoholic solution of the shellac is added with constant stirring. Next add the blue color, continuing to stir. Before this coating is applied to the steel, e. g., the spokes of a bicycle, the latter are first rubbed off with fine emery paper. The coat is put on with a soft rag. The quantity of pigment to be added is very small. By varying the quantity a paler or darker coloring of the steel can be produced.

PAINTS FOR ROOFS AND ROOF PAPER:

Carbolineum.—This German preparation is made in three colors.

I.—Pale.—Melt together in an iron kettle, over a naked fire, 30 parts of American rosin F and 150 parts of pale paraffine oil and stir in 10 parts of single rectified rosin oil.

II.—Dark.—Melt 100 parts of anthracene oil and 20 parts of American rosin F on a slow fire. Next stir in 2 parts of Para rubber solution (or solution of caoutchouc waste) and keep on boiling until all is dissolved. When this is done there should be still added 5 parts of crude concentrated carbolic acid and 5 parts of zinc chloride lye, 50° Bé., stirring until cool. The last-named admixture is not absolutely necessary, but highly advisable, owing to its extraordinary preservative and bactericidal properties.

III.—Colored.—For red, melt 100 parts of coal-tar oil, then stir in 50 parts of pale paraffine oil, and finally 75 parts of bole or iron minium, and pass through the paint mill. Although the addition of iron minium is very desirable, it is considerably more expensive. For gray, proceed as above, with the exception that metallic gray is used in place of the bole. For green, metallic green is employed. The colors are identical with those used in the manufacture of roof varnish. To increase the antiseptic properties of the colored carbolineum, any desired additions of phenol or zinc chloride solutions may be made, but the chief requirement in the case of colored carbolineum is good covering power of he coating.

Paints for Roofs Covered with Tar Paper, for Roofing Paper, etc.—

I.—	Distilled coal tar	70 parts
	Heavy mineral oil (lubricating oil)	10 parts
	American rosin	20 parts
II.—	Distilled coal tar	50 parts
	Trinidad asphalt	15 parts
	Mineral oil, containing paraffine	10 parts
	Dry clay, finely ground	25 parts

Imitation Oil Paint.—Schulz's German patent paint is cheap, and claimed to be

durable, weatherproof, and glossy, like oil paint. The application consists of a ground coat, upon which the surface coat proper is applied after the former is dry. For the preparation of the grounding dissolve 1,000 parts, by weight, of Marseilles soap in 10,000 parts of boiling water and stir. In a separate vessel dissolve 2,000 parts of glue in 10,000 parts of boiling water, adding 17,500 parts of spirit of sal ammoniac. These two solutions are poured together and well stirred. Then dissolve 400 parts of chrome alum in 5,000 parts of water, and pour into the above mixture. To this mixture add 10,000 parts of pipe clay, stirring the whole well and tinting with earth colors, ocher, Vandyke brown, etc. The solid ingredients must be dissolved in boiling hot water, and sifted so as to obtain a finely divided ground color. This priming is applied in a warm state. The coating proper is put on the ground coat after it is dry, in about one-half to one hour. For this coat dissolve 2,000 parts of crystallized alum in 10,000 parts of boiling water and add to this liquid a solution of 2,000 parts of glue in 10,000 parts of water; in a special vessel prepare soapsuds of 1,000 parts of Marseilles soap in 12,000 parts of boiling water; dissolve 120 parts of chrome alum in 1,500 parts of boiling water, and mix the three solutions together with diligent stirring. This paint or liquid should also be put on hot, and assures a durable exterior paint.

PAINTS, STAINS, ETC., FOR SHIPS.

Anti-Fouling Composition.—Make an agglutinant by heating together

	By weight
White lead, ground in oil	2 parts
Red lead, dry	1 part
Raw inseed oil	14 parts

While hot stir in yellow ocher, kaolin, baked clay in powder, or any inert body, such as silica, barytes, gypsum, etc., to form a stiff dough, and, without allowing this compound to become cold (the vessel should not be removed from the source of heat), dilute with more or less manganese linoleate to the required consistency.

Marine Paint to Resist Sea Water.—First prepare the water-resisting agglutinant by heating together

Dry white lead, carbonate only	1 part
Litharge	1 part
Linseed oil (fluid measure)	14 parts

Heat these and stir until of the consistency of thick glue, and for every 36 parts, by weight, of this compound add 3 parts, by weight, of turpentine, and 1 part, by weight, of mastic varnish (mastic rosin dissolved in turpentine); reheat the whole, and for every 32 parts, by weight, stir in and mix the following:

Baked and powdered clay	4 parts
Portland cement	16 parts
Zinc white	1 part
Red lead	1 part

After well mixing, dilute with more or less turpentine (not exceeding 25 per cent of the whole), or linoleate of manganese, the latter being preferable, as it has greater binding power. For colored paints use red oxide of iron or green oxide of chrome, but do not use chrome green or lead, as they will not stand the action of the sea water.

Compositions for Ships' Bottoms.—

Green.

Pale rosin	25	pounds
Prepared mineral green	8	pounds
D. L. zinc	13	pounds
Boiled oil	2	pounds
Mineral naphtha	1	gallon
Petroleum spirit	1½	gallons

Prepared Mineral Green.

Dry levigated mineral green	28	pounds
Turpentine	7	pounds
Turpentine varnish	7	pounds
Refined linseed oil	7	pounds

Copper Color.

Pale rosin	25	pounds
Light Italian ocher	15	pounds
D. L. zinc	5	pounds
Turkey red paint	½	pound
Petroleum spirit	1½	pounds
Mineral naphtha	1	pound

Pink.

Pale rosin	25	pounds
D. L. zinc	16	pounds
Deep vermilion	7	pounds
Mineral naphtha	1	gallon
Petroleum spirit	1½	gallons

PAINTS FOR WALLS OF CEMENT, PLASTER, HARD FINISH, ETC.

Coating for Bathrooms.—As a rule cement plastering, as well as oil paint, suffices for the protection of walls and ceilings in bathrooms, but attention must be called to the destructive action of medicinal admixtures. For such rooms as well as for laboratories, an

application of Swedish wood tar, made into a flowing consistency with a little oil of turpentine and put on hot, has been found very excellent. It is of advantage previously to warm the wall slightly. To the second coat add some wax. A very durable coating is obtained, which looks so pleasing that it is only necessary to draw some stripes with a darker paint so as to divide the surface into fields.

Cement, to Paint Over Fresh.—The wall should be washed with dilute sulphuric acid several days before painting. This will change the surplus caustic lime to sulphate of lime or gypsum. The acid should be about one-half chamber acid and one-half water. This should be repeated before painting, and a coat of raw linseed oil flowed on freely should be given for the first coat. While this cannot be always guaranteed as effectual for making the paint hold, it is the best method our correspondent has heard of for the purpose, and is worth trying when it is absolutely necessary to paint over fresh cement.

Damp Walls, Coating for.—Thirty parts of tin are dissolved in 40 parts of hydrochloric acid, and 30 parts of sal ammoniac are added. A powder composed of freestone, 50 parts; zinc oxide, 20 parts; pounded glass, 15 parts; powdered marble, 10 parts; and calcined magnesia, 5 parts, is prepared, and made into a paste with the liquid above mentioned. Coloring matter may be added. The composition may be used as a damp-proof coating for walls, or for repairing stonework, or for molding statues or ornaments.

Façade Paint.—For this zinc oxide is especially adapted, prepared with size or casein. Any desired earth colors may also be added. The surfaces are coated 3 times with this mass. After the third application is dry, put on a single coating of zinc chloride solution of 30° Bé. to which 3 per cent borax is added.

This coating is very solid, can be washed, and is not injured by hydrogen sulphide.

Hard-Finished Walls.—The treatment for hard-finished walls which are to be painted in flat colors is to prime with a thin coat of lead and oil well brushed into the wall. Next put on a thin coat of glue size; next a coat mixed with ⅓ oil and ⅔ turpentine; next a coat of flat paint mixed with turpentine. If you use any dry pigment mix it stiff in oil and thin with turps. If in either case the paint dries too fast, and is liable to show laps, put a little glycerine in, to retard the drying.

PAINTS, WATERPROOF AND WEATHERPROOF:

See also Fireproof Paint.

The following are claimed to be both waterproof and weatherproof:

I.—In 50 parts, by weight, of spirit of 96 per cent, dissolve 16 parts, by weight, of shellac, orange, finely powdered; 3 parts, by weight, of silver lake, finely powdered; and 0.6 parts, by weight, of gamboge, finely powdered. This paint may be employed without admixture of any siccative, and is excellently adapted for painting objects which are exposed to the inclemencies of the weather, as it is perfectly weatherproof.

II.—Mix glue water with zinc oxide (zinc white) and paint the respective object with this mixture. When this is dry (after about 2 hours) it is followed up with a coating of glue water and zinc chloride in a highly diluted state. Zinc oxide enters into a chemical combination with zinc chloride, which acquires the hardness of glass and a mirror-like bright surface. Any desired colors can be prepared with the glue water (size) and are practically imperishable. This zinc coating is very durable, dries quickly, and is 50 per cent cheaper than oil paint.

Water- and Acid-Resisting Paint.—Caoutchouc is melted with colophony at a low temperature, after the caoutchouc has been dried in a drying closet (stove) at 158° to 176° F., until no more considerable increase in weight is perceptible, while the colophony has completely lost its moisture by repeated melting. The raw products thus prepared will readily melt upon slight heating. To the melted colophony and caoutchouc add in a hot liquid state zinc white or any similar pigment. Thin with a varnish consisting of 50 parts of perfectly anhydrous colophony, 40 parts of absolute alcohol, and 40 parts of benzine. The whole syrupy mass is worked through in a paint mill to obtain a uniform product, at which operation more or less colophony varnish is added according to the desired consistency.

Water- and Air-Proof Paint.—An air-proof and waterproof paint, the subject of a recent French patent, is a compound of 30 parts, by weight, acetone; 100 parts acetic ether; 50 parts sulphuric ether; 100 parts camphor; 50 parts gum lac; 200 parts cotton; 100 parts paper

(dissolved in sulphuric acid); 100 parts mastic in drops. These proportions may fluctuate according to need. The paper is reduced well and dissolved without heat with sufficient sulphuric ether; the cotton is dissolved in the acetone and the whole is mixed together with the other ingredients and stirred well. The application is performed as with any other varnish. The coating is said not to crack or shrink and to be particularly useful as a protection against moisture for all stuffs.

PAINTS FOR WOOD:

See also Wood.

Floor Coating.—A new paint for floors, especially those of soft wood: Mix together 2.2 pounds joiners' glue; a little over 1 ounce powdered bichromate of potash; 3½ ounces aniline brown; and 10½ quarts water in a tin vessel. After 6 hours have elapsed (when the glue is completely soaked), heat gradually to the boiling point. The coating becomes perfectly water-tight after 2 or 3 days; it is not opaque, as the earthy body is lacking. The glue causes the wood fibers to be firmly united. It becomes insoluble by the addition of bichromate of potash, under the influence of light. Without this admixture a simple glue coat has formerly not been found satisfactory, as it dissolves if cleaned with water.

Durable House Paint. — I. — New houses should be primed once with pure linseed oil, then painted with a thin paint from white lead and chalk, and thus gradually covered. The last coat is prepared of well-boiled varnish, white lead, and chalk. The chalk has the mission to moderate the saponification of the linseed oil by the white lead. Mixing colors such as ocher and black, which take up plenty of oil, materially assist in producing a durable covering.

II.—Prime with zinc white and let this be succeeded by a coating with zinc chloride in glue water (size). The zinc oxide forms with the zinc chloride an oxy-chloride of great hardness and glossy surface. By admixture of pigments any desired shade may be produced. The zinc coating is indestructible, dries quickly, does not peel, is free from the smell of fresh oil paint, and more than 5 per cent cheaper.

Ivory Coating for Smooth, Light Wood.—In order to cover the articles, which may be flat or round, with this coating, they must first be polished quite smooth and clean: then they are coated with thin, hot, white glue. When the coat is thoroughly dry, the glue is rubbed off again with fine glass paper. The mass is prepared as follows: Take 3 pounds (more or less, according to the number of articles) of the purest and best collodion; grind upon a clean grinding stone twice the quantity that can be taken up with the point of a knife of Krems white, with enough good pale linseed oil as is necessary to grind the white smooth and fine. Take a clean bottle, into which one-half of the collodion is poured; to this add the ground white, which can be removed clean from the stone by means of a good spatula and put in the bottle. Add about 100 drops of linseed oil, and shake the mass till it looks like milk.

Now painting with this milky substance may be commenced, using a fine hair pencil of excellent quality. The pencil is not dipped in the large bottle; but a glass is kept at hand with an opening of about 1 inch, so as to be able to immerse the pencil quickly. The substance is not flowing like the alcohol lacquers, for which reason it may be put on thick, for the ether, chiefly constituting the mass, evaporates at once and leaves but a very thin film which becomes noticeable only after about 10 such applications have been made. Shake the bottle well each time before filling the small glass, as the heavy Krems white is very apt to sink to the bottom of the bottle. If it is observed that the substance becomes too thick, which may easily occur on account of the evaporation, a part of the remaining ether is added, to which in turn 30 to 40 drops of oil are added, shaking it till the oil appears to be completely dissolved.

The operator must put on the mass in quick succession and rather thick. After about 10 coats have been applied the work is allowed to rest several hours; then 3 or 4 coats of pure collodion, to which likewise several drops of oil have been added, are given. Another pause of several hours having been allowed to intervene, application of the mass is once more begun.

When it is noticed that a layer of the thickness of paper has formed, the articles, after drying thoroughly, should be softly rubbed off with very fine glass paper, after which they require to be wiped off well with a clean linen rag, so that no dust remains. Then coating is continued till the work seems serviceable.

A few applications of pure collodion should be made, and when this has become perfectly hard, after a few hours, it can be rubbed down with a rag,

tripoli, and oil, and polished by hand, like horn or ivory. This work can be done only in a room which is entirely free from dust. The greatest cleanliness must be observed.

MISCELLANEOUS RECIPES, PAINTS, ETC.:

Bathtub Paint.—Take white keg lead, tint to any desired color and then add, say, $\frac{1}{8}$ boiled oil (pure linseed) to $\frac{7}{8}$ hard drying durable body varnish. Clean the surface of the tub thoroughly before applying the paint. Benzine or lime wash are good cleaning agents. Coat up until a satisfactorily strong, pure color is reached. This will give good gloss and will also wear durably.

Coating for Name Plates.—A durable coating for name plates in nurseries is produced as follows: Take a woolen rag, saturate it with joiners' polish, lay it into a linen one, and rub the wooden surface with this for some time. Rub down with sandpaper and it can be written on almost like paper. When all is dry, coat with dammar lacquer for better protection. If the wood is to receive a color it is placed in the woolen rag before rubbing down, in this case chrome yellow.

To Keep Flies from Fresh Paint.—For the purpose of keeping flies and other insects away from freshly painted surfaces mix a little bay oil (laurel oil) with the oil paint, or place a receptacle containing same in the vicinity of the painted objects. The pungent odor keeps off the flies.

Heat-Indicating Paint.—A heat-indicating paint composed of a double iodide of copper and mercury was first discovered years ago by a German physicist. At ordinary temperatures the paint is red, but when heated to 206° F. it turns black. Paper painted with this composition and warmed at a stove exhibits the change in a few seconds. A yellow double iodide of silver and mercury is even more sensitive to heat, changing from yellow to dark red.

To Keep Liquid Paint in Workable Condition.—To prevent liquid paint which, for convenience sake, is kept in small quantities and flat receptacles, from evaporating and drying, give the vessels such a shape that they can be placed one on top of the other without danger of falling over, and provide the under side with a porous mass—felt or very porous clay, etc.—which, if moistened, will retain the water for a long time. Thus, in placing the dishes one on top of the other, a moist atmosphere is created around them, which will inhibit evaporation and drying of the paint. A similar idea consists in producing covers with a tight outside and porous inside, for the purpose of covering up, during intermission in the work, clay models and like objects which it is desired to keep soft. In order to avoid the formation of fungous growth on the constantly wet bottom, it may be saturated with non-volatile disinfectants, or with volatile ones if their vapors are calculated to act upon the objects kept underneath the cover. If the cover is used to cover up oil paints, it is moistened on the inside with volatile oil, such as oil of turpentine, oil of lavender, or with alcohol.

Peeling of Paints.—For the prevention of peeling of new coatings on old oil paintings or lakes, the latter should be rubbed with roughly ground pumice stone, wet by means of felt rags, and to the first new coat there should be added fine spirit in the proportion of about $\frac{1}{10}$ of the thinning necessary for stirring (turpentine, oil, etc.). This paint dries well and has given good results, even in the most difficult cases. The subsequent coatings are put on with the customary paint. Fat oil glazes for graining are likewise mixed with spirit, whereby the cracking of the varnish coating is usually entirely obviated.

Polychroming of Figures.—This paint consists of white wax, 1 part, and powdered mastic, 1 part, melted together upon the water bath and mixed with rectified turpentine. The colors to be used are first ground stiffly in turpentine on the grinding slab, and worked into consistency with the above solution.

Priming Coat for Water Spots.—A good way to remove rain spots, or such caused by water soaking through ceilings, has been employed with good results. Take unslaked white lime, dilute with alcohol, and paint the spots with it. When the spots are dry—which ensues quickly, as the alcohol evaporates and the lime forms a sort of insulating layer—one can proceed painting with size color, and the spots will not show through again.

TIRE PRESERVING PAINT:

Mix thoroughly: 2 pounds Linseed Oil; 2 pounds Petroleum; 1 pound Cottonseed Oil.

Then to this mixture add just enough dry white lead to give it a color similar to a new tire.

PAINT PLASTIC:

1 quart flat wall paint
1 pound plaster Paris
8 ounces bolted whiting
2 fluidounces good varnish

Mix all together. If wanted thicker add more plaster Paris and whiting, but use twice as much plaster Paris as whiting. Use different colored flat wall paint according to the shade desired. Use best varnish you can obtain.

Paper

Paper Pads (see also Adhesives, under Glue).

I.—Glue.....	3½ ounces
Glycerine.....	8 ounces
Water, a sufficient quantity.	

Pour upon the glue more than enough water to cover it and let stand for several hours, then decant the greater portion of the water; apply heat until the glue is dissolved, and add the glycerine. If the mixture is too thick, add more water.

II.—Glue.....	6 ounces
Alum.....	30 grains
Acetic acid.....	½ ounce
Alcohol.....	1½ ounces
Water.....	6½ ounces

Mix all but the alcohol, digest on a water bath till the glue is dissolved, allow to cool, and add the alcohol.

Papier Maché.—The following are the ingredients necessary to make a lump of papier maché a little larger than an ordinary baseball and weighing 17 ounces:

Wet paper pulp, dry paper, 1 ounce; water, 3 ounces; 4 ounces (avoirdupois); dry plaster Paris, 8 ounces (avoirdupois); hot glue, ½ gill, or 4½ tablespoonfuls.

While the paper pulp is being prepared, melt some best Irish glue in the glue pot and make it of the same thickness and general consistency as that used by cabinet makers. On taking the paper pulp from the water squeeze it gently, but do not try to dry it. Put in a bowl, add about 3 tablespoonfuls of the hot glue, and stir the mass up into a soft and very sticky paste. Add the plaster of Paris and mix thoroughly. By the time about 3 ounces of the plaster have been used, the mass is so dry and thick that it can hardly be worked. Add the remainder of the glue, work it up again until it becomes sticky once more, and then add the remainder of the plaster. Squeeze it vigorously through the fingers to thoroughly mix the mass, and work it until free from lumps, finely kneaded and sticky enough to adhere to the surface of a planed board. If it is too dry to stick fast add a few drops of either glue or water, and work it up again. When the paper pulp is poor and the maché is inclined to be lumpy, lay the mass upon a smooth board, take a hammer and pound it hard to grind it up fine.

If the papier maché is not sticky enough to adhere firmly to whatever it is rubbed upon, it is a failure, and requires more glue. In using it the mass should be kept in a lump and used as soon as possible after making. Keep the surface of the lump moist by means of a wet cloth laid over it, for if you do not, the surface will dry rapidly. If it is to be kept overnight, or longer, wrap it up in several thicknesses of wet cotton cloth, and put under an inverted bowl. If it is desired to keep a lump for a week, to use daily, add a few drops of glycerine when making, so that it will dry more slowly.

The papier maché made according to this formula has the following qualities: When tested by rubbing between the thumb and finger, it was sticky and covered the thumb with a fine coating. (Had it left the thumb clean, it would have been because it contained too much water.) When rubbed upon a pane of glass it sticks tightly and dries hard in 3 hours without cracking, and can only be removed with a knife. When spread in a layer as thin as writing paper it dries in half an hour. A mass actually used dried hard enough to coat with wax in 18 hours, and, without cracking, became as hard as wood; yet a similar quantity wrapped in a wet cloth and placed under an inverted bowl kept soft and fit for use for an entire week.

Parchment Paper.—I.—Dip white unsized paper for half a minute in strong sulphuric acid, specific gravity, 1.842, and afterwards in water containing a little ammonia.

II.—Plunge unsized paper for a few seconds into sulphuric acid diluted with half to a quarter its bulk of water (this solution being of the same temperature as the air), and afterwards wash with weak ammonia.

Razor Paper.—I.—Smooth unsized paper, one of the surfaces of which, while in a slightly damp state, has been rubbed over with a mixture of calcined peroxide of iron and emery, both in impalpable powder. It is cut up into

pieces (about 5 x 3 inches), and sold in packets. Used to wipe the razor on, which thus does not require stropping.

II.—From emery and quartz (both in impalpable powder), and paper pulp (estimated in the dry state), equal parts, made into sheets of the thickness of drawing paper, by the ordinary process. For use, a piece is pasted on the strop and moistened with a little oil.

Safety Paper.—White paper pulp mixed with an equal quantity of pulp tinged with any stain easily affected by chlorine, acids, alkalies, etc., and made into sheets as usual, serves as a safety paper on which to write checks or the like. Any attempt to wash out the writing affects the whole surface, showing plainly that it has been tampered with.

Tracing Paper.—Open a quire of smooth, unsized white paper, and place it flat upon a table. Apply, with a clean sash tool to the upper surface of the first sheet, a coat of varnish made of equal parts of Canada balsam and oil of turpentine, and hang the prepared sheet across the line to dry; repeat the operation on fresh sheets until the proper quantity is finished. If not sufficiently transparent, a second coat of varnish may be applied as soon as the first has become quite dry.

Strengthened Filter Paper.—When ordinary filter paper is dipped into nitric acid (specific gravity, 1.42), thoroughly washed and dried, it becomes a tissue of remarkable properties, and one that deserves to be better known by chemists and pharmacists. It shrinks somewhat in size and in weight, and gives, on burning, a diminished ash. It yields no nitrogen, nor does it in the slightest manner affect liquids. It remains perfectly pervious to liquids, its filtering properties being in no wise affected, which, it is needless to say, is very different from the behavior of the same paper "parchmented" by sulphuric acid. It is as supple as a rag, yet may be very roughly handled, even when wet, without tearing or giving way. These qualities make it very valuable for use in filtration under pressure or exhaust. It fits closely to the funnel, upon which it may be used direct, without any supports, and it thus prevents undue access of air. As to strength, it is increased upward of 10 times. A strip of ordinary white Swedish paper, $\frac{1}{4}$ of an inch wide, will sustain a load of from $\frac{1}{2}$ to $\frac{3}{4}$ of a pound avoirdupois, according to the quality of the paper. A similar strip of the toughened paper broke, in 3 trials, with 5 pounds, 7 ounces, and 3 drachms; 5 pounds, 4 ounces, and 36 grains; and 5 pounds, 10 ounces respectively. These are facts that deserve to be better known than they seem to be to the profession at large.

Blotting Paper.—A new blotting paper which will completely remove wet as well as dry ink spots, after moistening the paper with water, is produced as follows: Dissolve 100 parts of oxalic acid in 400 parts of alcohol, and immerse porous white paper in this solution until it is completely saturated. Next hang the sheets up separately to dry over threads. Such paper affords great advantages, but in its characteristic application is serviceable for ferric inks only, while aniline ink spots cannot be removed with it, after drying.

Carbon Paper.—Many copying papers act by virtue of a detachable pigment, which, when the pigmented paper is placed between two sheets of white paper, and when the uppermost paper is written on, transfers its pigment to the lower white sheet along lines which correspond to those traced on the upper paper, and therefore gives an exact copy of them on the lower paper.

The pigments used are fine soot or ivory black, indigo carmine, ultramarine, and Paris blue, or mixtures of them. The pigment is intimately mixed with grain soap, and then rubbed on to thin but strong paper with a stiff brush. Fatty oils, such as linseed or castor oil, may be used, but the grain soap is preferable. Graphite is frequently used for black copying paper. It is rubbed into the paper with a cotton pad until a uniform light-gray color results. All superfluous graphite is then carefully brushed off.

It is sometimes desired to make a copying paper which will produce at the same time a positive copy, which is not required to be reproduced, and a negative or reversed copy from which a number of direct copies can be taken. Such paper is covered on one side with a manifolding composition, and on the other with a simple copying composition, and is used between 2 sheets of paper with the manifolding side undermost.

The manifolding composition is made by mixing 5 ounces of printers' ink with 40 of spirits of turpentine, and then mixing it with a fused mixture of 40 ounces of tallow and 5 ounces of stearine. When the mass is homogeneous, 30 ounces of the finest powdered protoxide of iron, first mixed with 15 ounces of pyrogallic

acid and 5 ounces of gallic acid, are stirred in till a perfect mixture is obtained. This mass will give at least 50 copies on damp paper in the ordinary way. The copying composition for the other side of the prepared paper consists of the following ingredients:

Printers' ink	5 parts
Spirits of turpentine.	40 parts
Fused tallow	30 parts
Fused wax	3 parts
Fused rosin	2 parts
Soot	20 parts

It goes without saying that rollers or stones or other hard materials may be used for the purpose under consideration as well as paper. The manifolding mass may be made blue with indigotin, red with magenta, or violet with methyl violet, adding 30 ounces of the chosen dye to the above quantities of pigment. If, however, they are used, the oxide of iron and gallic acids must be replaced by 20 ounces of carbonate of magnesia.

Celloidin Paper.—Ordinary polished celluloid and celloidin paper are difficult to write upon with pen and ink. If, however, the face is rubbed over with a chalk crayon, and the dust wiped off with a clean rag, writing becomes easy.

Cloth Paper.—This is prepared by covering gauze, calico, canvas, etc., with a surface of paper pulp in a Foudrinier machine, and then finishing the compound sheet in a nearly similar manner to that adopted for ordinary paper.

Drawing Paper.—The blue drawing paper of commerce, which is frequently employed for technical drawings, is not very durable. For the production of a serviceable and strong drawing paper, the following process is recommended. Mix a solution of

Gum arabic	2 parts
Ammonia iron citrate.	3 parts
Tartaric acid	2 parts
Distilled water	20 parts

After still adding 4 parts of solution of ammonia with a solution of

Potassium ferricyanide	2.5 parts
Distilled water	10.0 parts

allow the mixture to stand in the dark half an hour. Apply the preparation on the paper by means of a soft brush, in artificial light, and dry in the dark. Next, expose the paper to light until it appears dark violet, place in water for 10 seconds, air a short time, wash with water, and finally dip in a solution of

Eau de javelle	50 parts
Distilled water	1,000 parts

until it turns dark blue.

Filter Paper.—This process consists in dipping the paper in nitric acid of 1.433 specific gravity, subsequently washing it well and drying it. The paper thereby acquires advantageous qualities. It shrinks a little and loses in weight, while on burning only a small quantity of ash remains. It possesses no traces of nitrogen and does not in any way attack the liquid to be filtered. Withal, this paper remains perfectly pervious for the most varying liquids, and its filtering capacity is in no wise impaired. It is difficult to tear, and still elastic and flexible like linen. It clings completely to the funnel. In general it may be said that the strength of the filtering paper thus treated increases 100 per cent.

Fireproof Papers.—I.—Ammonium sulphate, 8 parts, by weight; boracic acid, 3 parts; borax, 2 parts; water, 100 parts. The temperature should be about 122° F.

II.—For paper, either printed or unprinted, bills of exchange, deeds, books, etc., the following solution is recommended: Ammonium sulphate, 8 parts; boracic acid, 3 parts; sodium borate, 1.7 parts; water, 10,000 parts. The solution is heated to 122° F., and may be used when the paper is manufactured. As soon as the paper leaves the machine it is passed through this solution, then rolled over a warm cylinder and dried. If printed or in sheets, it is simply immersed in the solution, at a temperature of 122° F., and spread out to dry, finally pressed to restore the luster.

Hydrographic Paper.—This is paper which may be written on with simple water or with some colorless liquid having the appearance of water.

I.—A mixture of nut galls, 4 parts, and calcined sulphate of iron, 1 part (both perfectly dry and reduced to very fine powder), is rubbed over the surface of the paper, and is then forced into its pores by powerful pressure, after which the loose portion is brushed off. The writing shows black when a pen dipped in water is used.

II.—A mixture of persulphate of iron and ferrocyanide of potassium may be employed as in formula I. This writes blue.

Iridescent Paper.—Sal ammoniac and sulphate of indigo, of each 1 part; sulphate of iron, 5 parts; nut galls, 8 parts; gum arabic, $\frac{1}{8}$ part. Boil them in water, and expose the paper washed with the liquid to (the fumes of) ammonia.

Lithographic Paper.—I.—Starch, 6 ounces; gum arabic, 2 ounces; alum, 1 ounce. Make a strong solution of each separately, in hot water, mix, strain through gauze, and apply it while still warm to one side of leaves of paper, with a clean painting brush or sponge; a second and a third coat must be given as the preceding one becomes dry. The paper must be, lastly, pressed, to make it smooth.

II.—Give the paper 3 coats of thin size, 1 coat of good white starch, and 1 coat of a solution of gamboge in water, the whole to be applied cold, with a sponge, and each coat to be allowed to dry before the other is applied. The solutions should be freshly made.

Lithographic paper is written on with lithographic ink. The writing is transferred simply by moistening the back of the paper, placing it evenly on the stone, and then applying pressure. A reversed copy is obtained, which, when printed from, yields corrected copies resembling the original writing or drawing. In this way the necessity of executing the writing or drawing in a reversed direction is obviated.

MARBLING PAPER FOR BOOKS.

Provide a wooden trough 2 inches deep and the length and width of any desired sheet; boil in a brass or copper pan a quantity of linseed and water until a thick mucilage is formed; strain it into a trough, and let cool; then grind on a marble slab any of the following colors in small beer:

For Blue.—Prussian blue or indigo.

Red.—Rose pink, vermilion, or drop lake.

Yellow.—King's yellow, yellow ocher, etc.

White.—Flake white.

Black.—Burnt ivory or lampblack.

Brown.—Umber, burnt; terra di sienna, burnt.

Black mixed with yellow or red also makes brown.

Green.—Blue and yellow mixed.

Orange.—Red and yellow mixed.

Purple.—Red and blue mixed.

For each color have two cups, one for the color after grinding, the other to mix it with ox gall, which must be used to thin the colors at discretion. If too much gall is used, the colors will spread. When they keep their place on the surface of the trough, when moved with a quill, they are fit for use. All things in readiness, the colors are successively sprinkled on the surface of the mucilage in the trough with a brush, and are waved or drawn about with a quill or a stick, according to taste. When the design is just formed, the book, tied tightly between cutting boards of the same size, is lightly pressed with its edge on the surface of the liquid pattern, and then withdrawn and dried. The covers may be marbled in the same way, only letting the liquid colors run over them. In marbling paper the sides of the paper are gently applied to the colors in the trough. The film of color in the trough may be as thin as possible, and if any remains after the marbling it may be taken off by applying paper to it before you prepare for marbling again. To diversify the effects, colors are often mixed with a little sweet oil before sprinkling them on, by which means a light halo or circle appears around each spot.

WATERPROOF PAPERS.

I.—Wall papers may be easily rendered washable, either before or after they are hung, by preparing them in the following manner: Dissolve 2 parts of borax and 2 parts of shellac in 24 parts of water, and strain through a fine cloth. With a brush or a sponge apply this to the surface of the paper, and when it is dry, polish it to a high gloss with a soft brush. Thus treated the paper may be washed without fear of removing the colors or even smearing or blurring them.

II.—This is recommended for drawing paper. Any kind of paper is lightly primed with glue or a suitable binder, to which a finely powdered inorganic body, such as zinc white, chalk, lime, or heavy spar, as well as the desired coloring matter for the paper, are added. Next the paper thus treated is coated with soluble glass—silicate of potash or of soda—to which small amounts of magnesia have been admixed, or else it is dipped into this mixture, and dried for about 10 days in a temperature of 77° F. Paper thus prepared can be written or drawn upon with lead pencil, chalk, colored crayons, charcoal, India ink, and lithographic crayon, and the writing or drawing may be washed off 20 or more times, entirely or partly, without changing the paper materially. It offers the convenience that anything may be readily and quickly removed with a moist sponge and immediately corrected, since the washed places can be worked on again at once.

Wax Paper.—I.—Place cartridge paper, or strong writing paper, on a hot iron